Bulletin K

IRVING FLOOR ARMORING

CONTINUOUS

IN EVERY DIRECTION AS A RESULT OF THE USE OF THE "STREAMLINE" JOINT

IRVING IRON WORKS CO.

LONG ISLAND CITY, N.Y. U.S.A.

Established in 1902

THE coming of the motor car and truck, and the resultant increase in the volume, loads and speeds of vehicular traffic, brought about revolutionary changes in road and highway construction.

Modern developments in the industrial world have raised problems just as serious, in connection with industrial floors and traffic ways. And the production of a flooring which will withstand plant traffic and the heavy duty of industrial service, has challenged the best engineering talent.

Floors of wood, brick, tile, cement, asphalt, composition—they all have their place and their adherents, and each has its advantages and disadvantages, its benefits and its shortcomings. But with the relative merits of various floors and flooring materials, this Bulletin has nothing to do.

It starts with the premise, everywhere admitted, that the perfect industrial floor has yet to be devised. And it presents "Irving" Continuous Floor Armoring, not as a substitute for any flooring, but as a means of making any "plastic" floor—concrete, asphalt, mastic, or composition—a better, more durable, and more economical floor.

It may be of interest to add, at this point, that the Irving Iron Works Company has—since 1912—been intimately and exclusively identified with the design and manufacture of open steel floorings. This highly specialized experience of more than 16 years has given it contact with, and unmatched opportunities to observe, industrial floorings of every kind and description. The Company, therefore, has attacked the problem of floor armoring equipped with a knowledge of floor problems probably unequaled by that of any other firm in the field.

ARMORING

The Logical Answer to an Admittedly Serious Problem

THE armoring of concrete floors is not a new idea. Almost from the first appearance of concrete as a flooring material, it was admitted that a mixture of sand and cement was in itself sadly lacking in the ability to resist shock or impact of falling weights, and the grinding abrasion of wheeled traffic and rolling loads. So-called surface "hardeners" helped mitigate the "dusting" evil but failed to give concrete the structural strength which was requisite for steady industrial traffic resistance.

The logical answer was the use of metal inserts in the concrete, at points of heaviest service—these inserts taking the form of solid metal plates, of open cast plates, of punched plates or of iron bars, grids and gratings of various types—the idea being that the metal would take the shocks and carry the loads, while the concrete functioned only to fill the voids and provide an even surface.

It was inevitable that this Company, specializing on flooring problems over so many years, should encounter this industrial phase of its business early in its career. And it was logical that the outstanding advantages of **Irving "Subway"** as an open steel grating and flooring, should suggest it as possessing equally distinctive advantages as a surface reinforcement or armoring for concrete floors, loading platforms, and the like.

As a matter of fact, among the earliest applications of **Irving "Subway"** Flooring was the placing of panels of this "reticuline" steel structure flush with the concrete surface, as an armoring for concrete floors. Observations over many years justify the statement that—up to the present—panels of **"Subway"** Flooring gave the best service of all the many armorings. Such experience is a matter of testimonial record in diverse industries, over years of daily service.

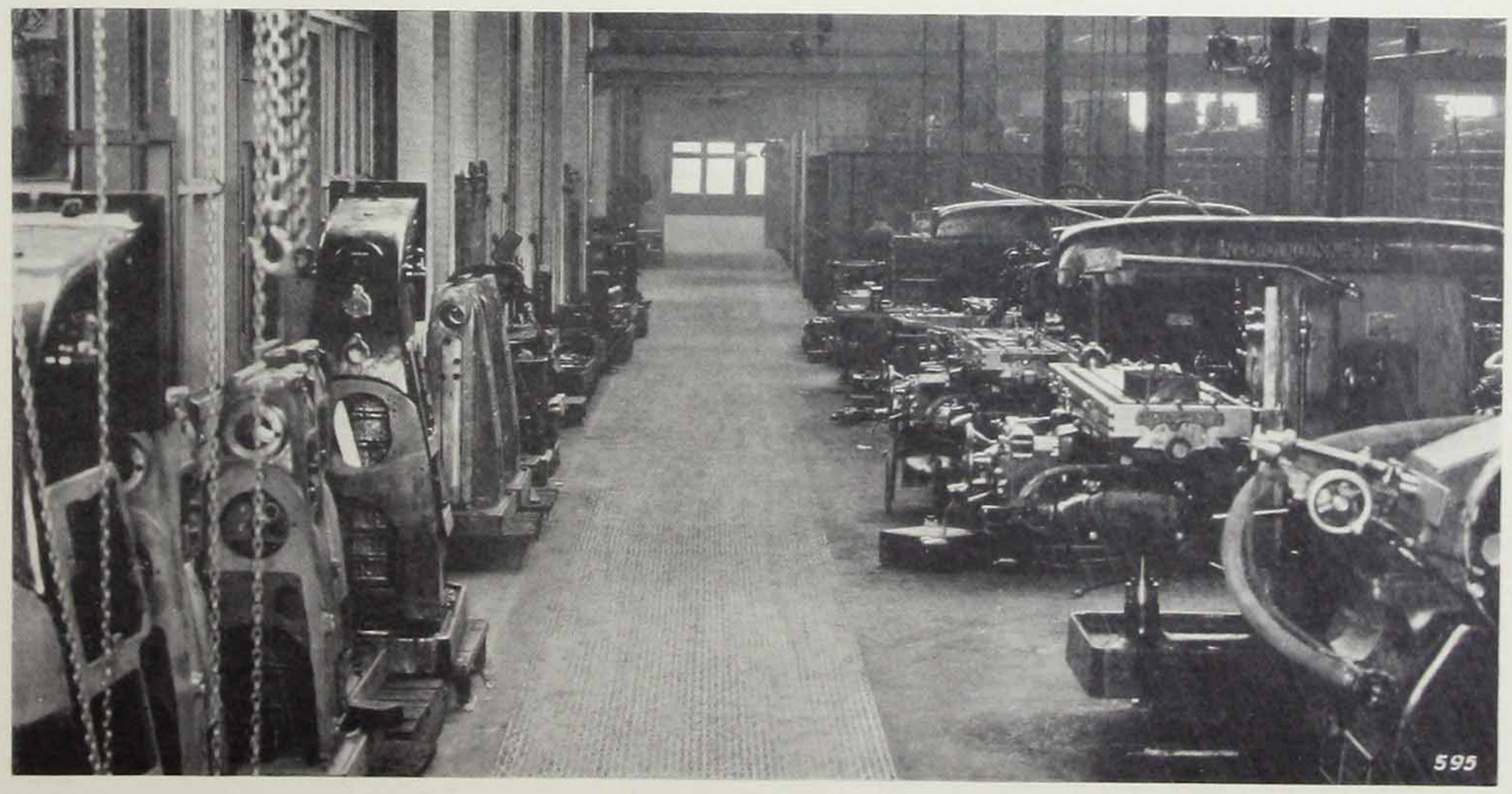
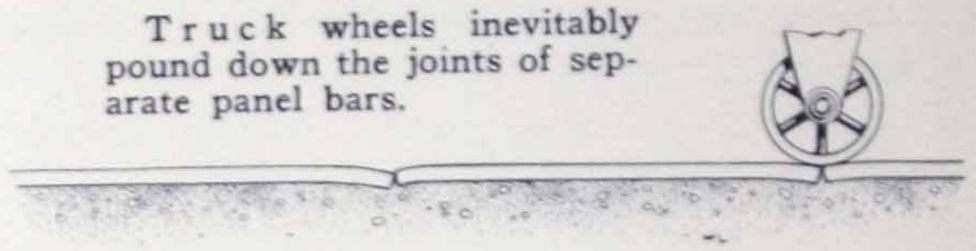


Plate A—This "Irving" Armored aisleway has stood 4 years' heavy trucking in the machine shop of a prominent machine tool builder, without any upkeep cost—and none in sight.

No System of Individual Units, However, Can Solve the Problem

It has long been evident, however, that no method of armoring by individual independent units—whether plate, grid or grating—and whether by bars, "egg-crate" or **"Subway"**—can give the entire satisfaction sought, for the following reason: Each individual plate or panel—no matter how carefully set and anchored—is, after all, a collection of beams with relatively unsupported ends and edges. It is well-nigh impossible so to lay these units with abutting joints that there are no irregularities or inequalities in the surface at the joint. Rolling loads over these irregularities cause shock or impact which loosens the edge of the unit. Repeated traffic ultimately displaces the units—until a condition is reached in which the further use of the armored (?) surface is impossible and the job must be replaced either in whole or part.



Truck wheels inevitably pound down the joints of separate panel bars.

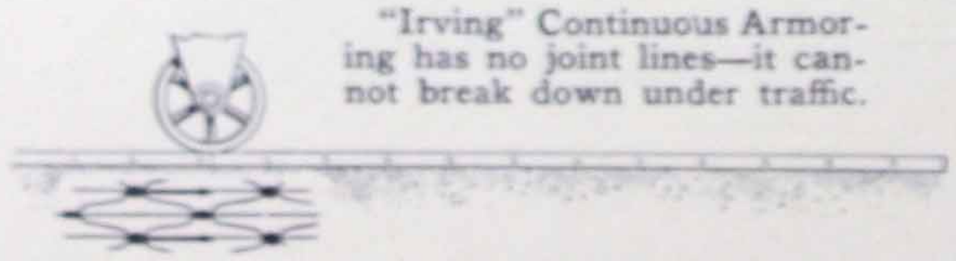
CONTINUITY

The Essential Thing in Armoring

The vital element lacking in all methods of concrete surface armoring up to the present, is ***continuity—a unified construction of the steel structure over the entire armored surface,*** so that there can be no opportunity for rolling (or other) impact to start looseness and play at any point.

Yet, in spite of this past structural weakness, armoring has been notably successful where installations of panel-type grating have been made with care. Now, with the floor armor made continuous every disadvantage has been removed. **Continuous floor armoring** makes an abuse-proof floor for any installation—and a floor whose evenness of surface is inherent in its design and not at all dependent upon super-care of installation.

Just as a new laid concrete floor presents a perfect surface on which wheeled trucks roll without impact, and just as a pitted concrete floor presents a condition where impact aggravates the unevenness,



"Irving" Continuous Armoring has no joint lines—it cannot break down under traffic.

—So the value of **"Irving" Armoring** is that ***it maintains, indefinitely, the newness and evenness of the floor of which it is a part.***

An **"Irving"** Armored floor is a smooth floor because the surface is that of the **"Irving"** Armoring; which latter presents a true top surface because its method of fabrication insures the top of each bar being absolutely flush with the top of every other bar.

Loaded trucks roll over the **"Irving"** Armoring with the smoothness with which trolley wheels roll over welded rail joints—no panel-end unevenness, no impact shock from surface inequalities. **"Irving"** Armoring is the ideal floor surfacing where wear otherwise disintegrates the flooring material, because the entire floor armoring is one unbroken unit—a continuous steel surface in all directions. Wheeled loads move on **"Irving"** Armoring with a smooth rolling motion which makes for efficient transportation as well as long life.

The Irving "Streamline" Joint Provides the Needed Continuity

This vital, and so long lacking, element in concrete armoring is the distinctive and outstanding feature of **"Irving"** Continuous Armoring. And it is made possible only by the use of the patented **Irving "Streamline"** Joint which does away with all butt joints and unsupported bar ends or panel edges. It is, without question, the most notable improvement in "mesh" or open floorings made in recent years.

"Irving" Continuous Armoring retains the distinctive **"Irving"** construction — straight bars alternating with "reticuline" bars of somewhat lesser depth, assembled and riveted together with all edges absolutely flush on one face of the assembly. Here is a trussed steel structure ***having a greater load-carrying capacity per unit of weight, than any other form of grating.*** In this **"Irving"** construction, no one member must bear the burden of a steady, or a shock, load. On the contrary, such load is distributed by the truss structure among the members within a wide surrounding area.

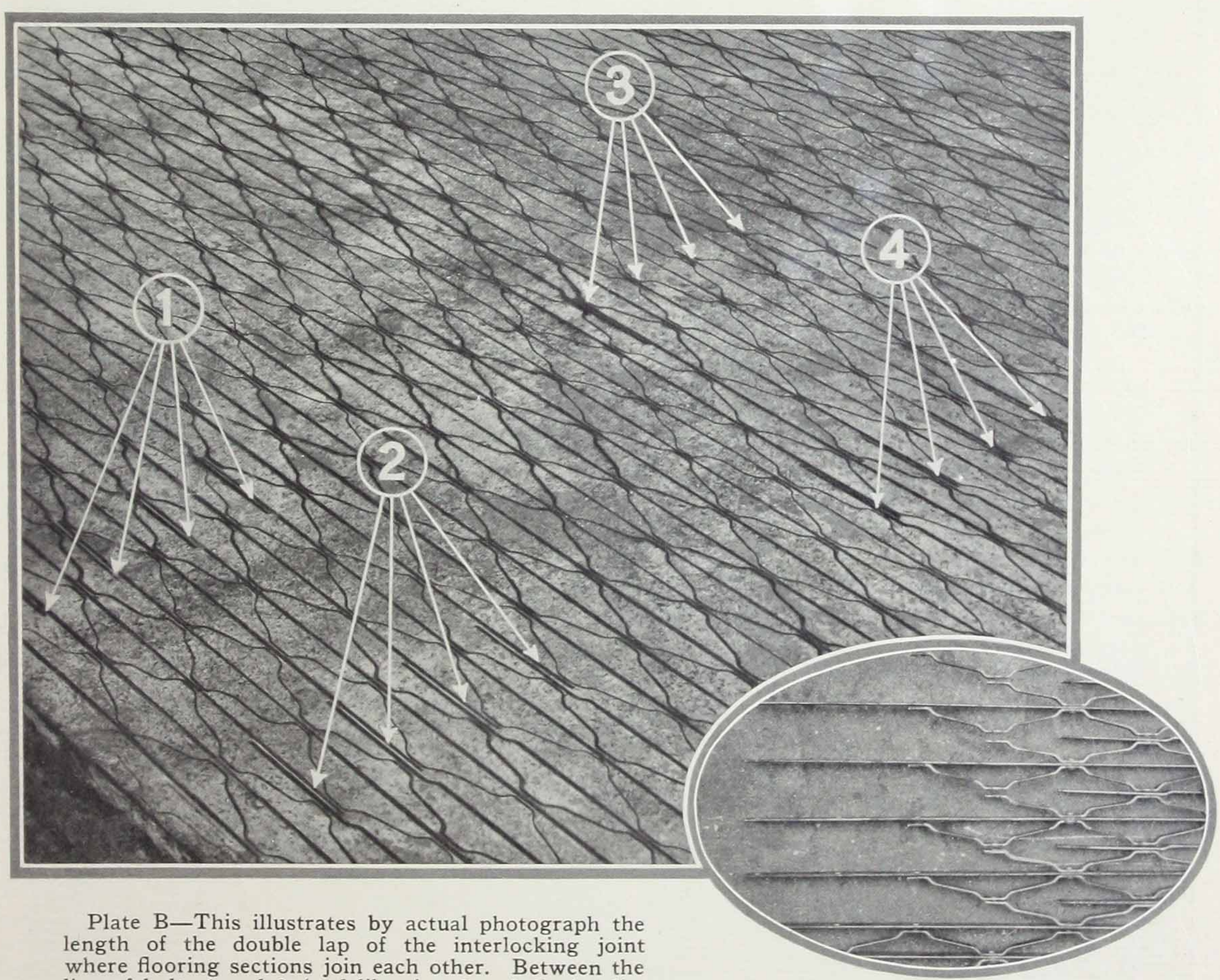


Plate B—This illustrates by actual photograph the length of the double lap of the interlocking joint where flooring sections join each other. Between the line of bolts 1 and 2 (and likewise, 3 and 4) the distance is 17½ inches, in which space all the bars of one section interlock and are bolted to matching bars of the other. The dovetail effect interweaves the panels so completely that there is, in effect, no break in the armor-grating.

A detail of the Irving "Streamline" Joint

I

SOME INSTALLATIONS OF "IRVING" ARMORED FLOORS

Cincinnati Milling Machine Co., Cincinnati, Ohio.

Southern Dairies Co., Montgomery, Ala.

Buick Motor Car Co., Flint, Michigan.

Bryant Paper Co., Kalamazoo, Michigan.

Hanford Produce Co., Sioux City, Iowa.

Durr Packing Co., Utica, N. Y.

Minneapolis Journal, Minneapolis, Minn.

American Radiator Co., Springfield, Ohio.

Baltimore Sun, Baltimore, Md.

Dennison Mfg. Co., Framingham, Mass.

Reid Ice Cream Co., Brooklyn, N. Y.

John Manning Paper Co., Troy, N. Y.

Kengan Provision Co., Baltimore, Md.

Chapin Sacks Corp., Washington, D. C.

Keith Paper Co., Turner Falls, Mass.

Hollingsworth & Vose, East Walpole, Mass.

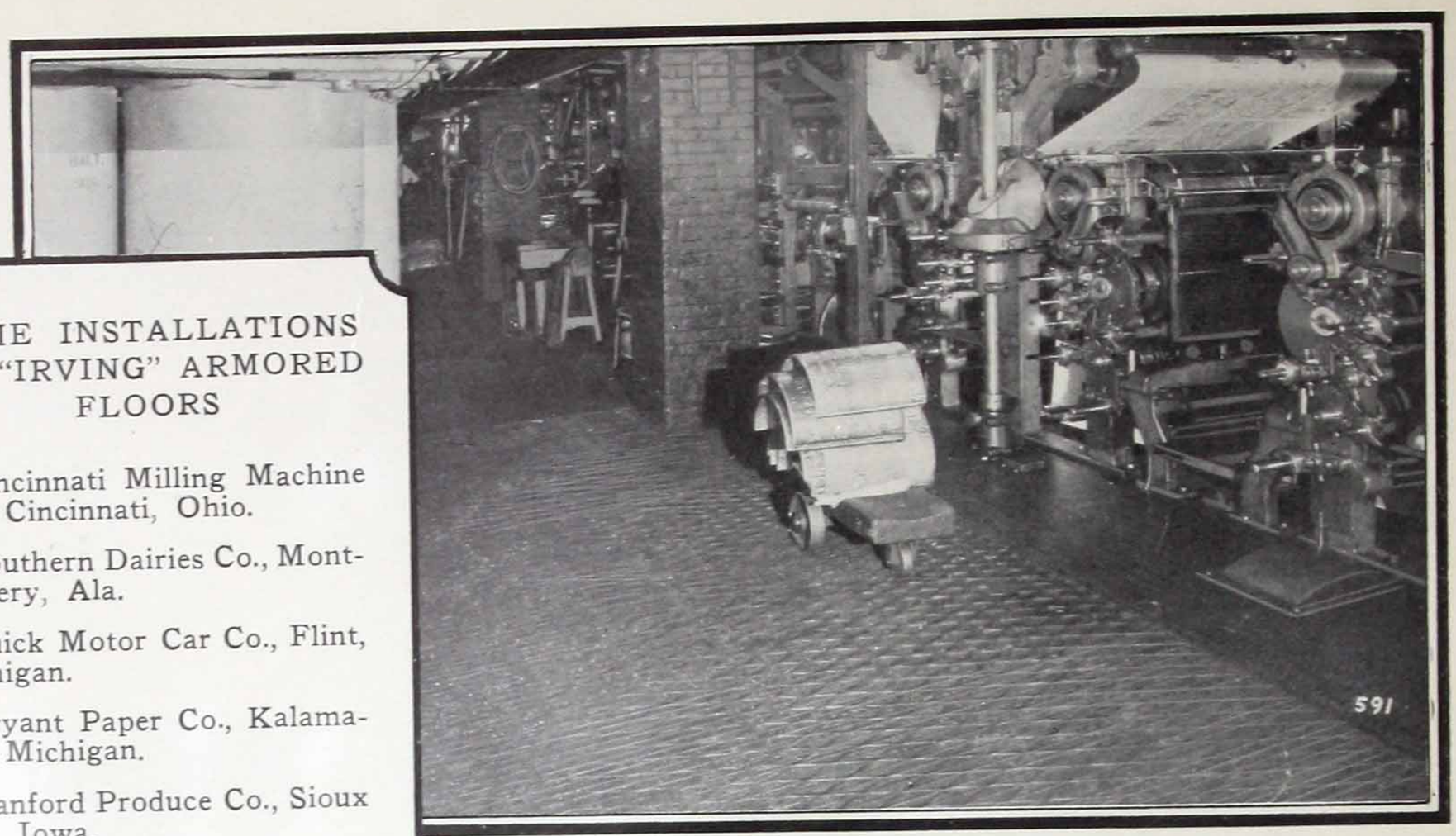
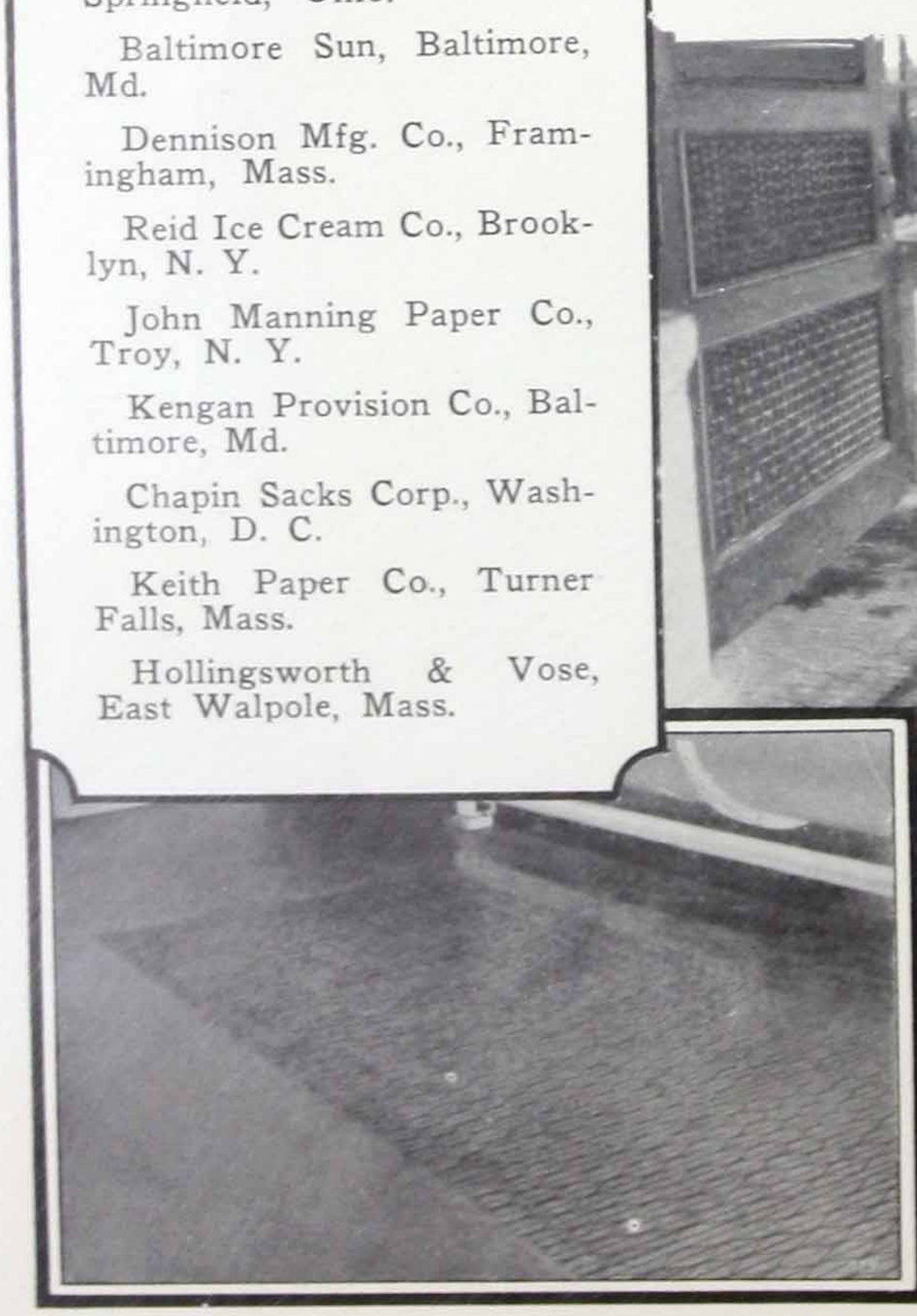


Plate C—The "Irving" Armored floor in this pressroom is standing the traffic of heavy trucks without sign of wear.

Plate D—Day after day, month after month, handling of heavy milk cans makes no impression on this "Irving" Armored loading platform.



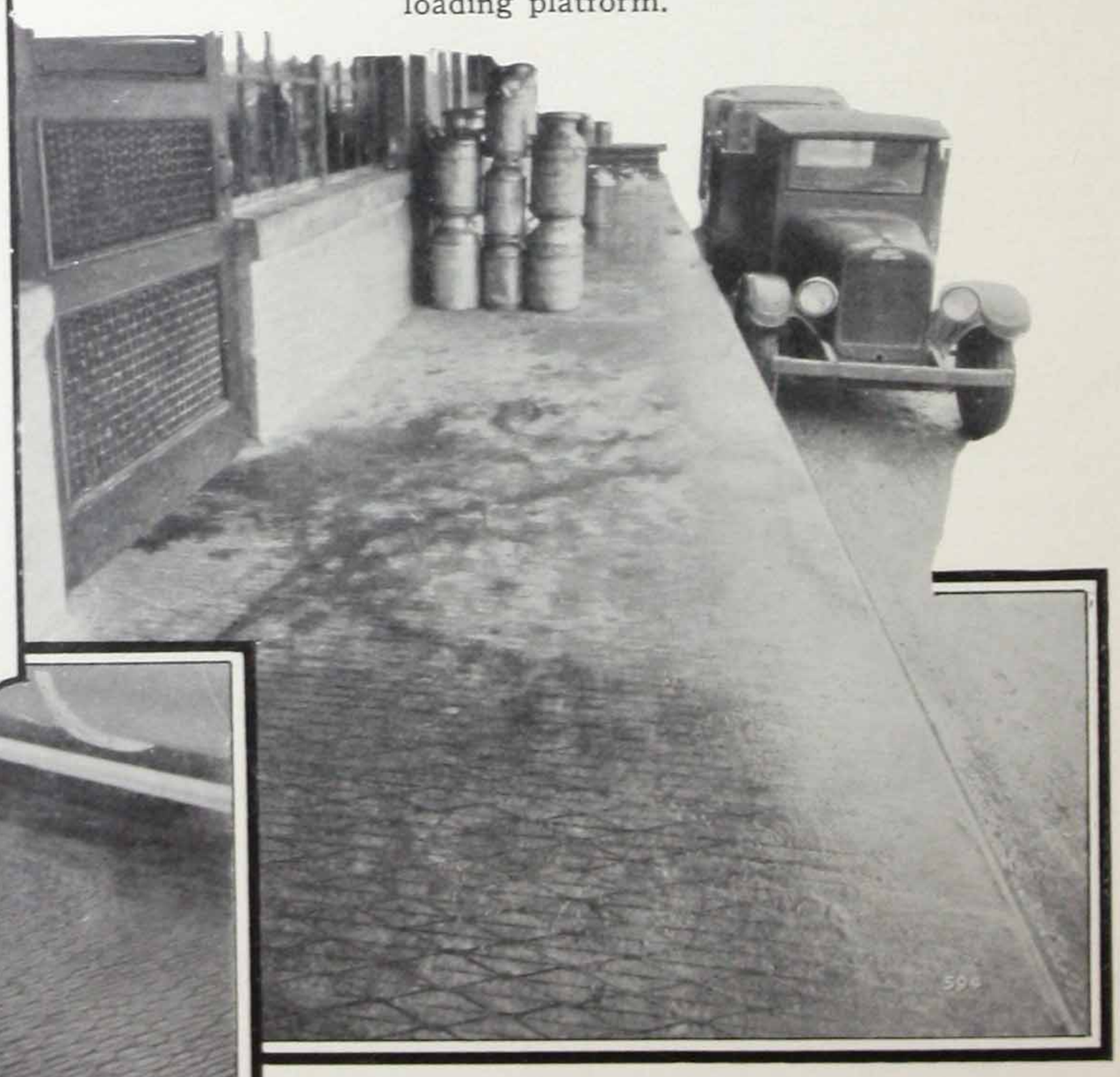


Plate E—Installed in a dairy plant in 1921, this "Irving" Armored floor has required no maintenance whatever.

How Continuity is Secured

Sections of this trussed **"Irving"** Flooring, fabricated not in square-ended panels but with the ends of the straight and "reticuline" bars projecting in alternate long and short lengths (see sketch), are assembled end to end with "staggered" offset lapped joints in all bars, securely bolted. Sections adjoining laterally are assembled with their joints "staggered" in relation to the other section joints. Along the sides, the sections are bolted together.

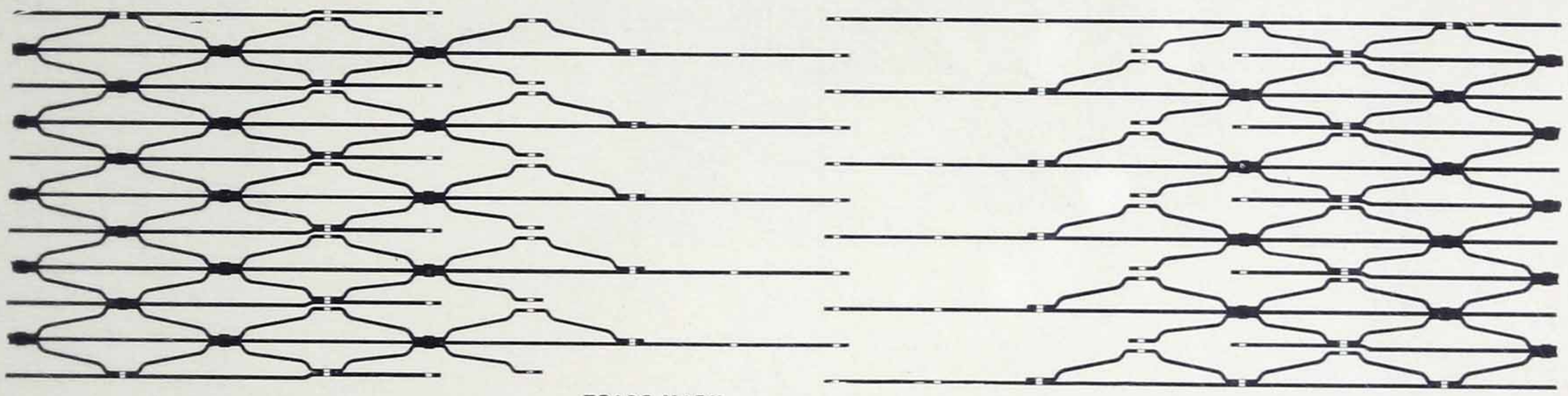
The **"Irving"** Armoring, thus assembled, forms a continuous and unbroken trussed steel structure over the entire surface to be protected—a structure having no weak points, for laboratory tests prove that the load strength of a "Streamline" joint is equal to that of an unspliced section. There being no butt joints, the surface is a continuous one of rail-like smoothness, with no possible chance for looseness and play, and consequent wheel shocks, to develop.

This steel armoring network—leveled and anchored to the sub-floor by the methods described in detail later—is then poured over with concrete, mastic, composition or other plastic flooring—tamped or rolled into the "mesh" of the armoring—and the superfluous material scraped off, flush with the steel bar edges.

The result is an even, continuous, solid floor of whatever material is chosen, with a ***continuous*** embedded surface armoring of tough steel bars to carry the loads of traffic, withstand the crushing tendency of rolling wheel loads, and absorb and distribute the shock and jar of falling boxes, barrels, drums, or what not.

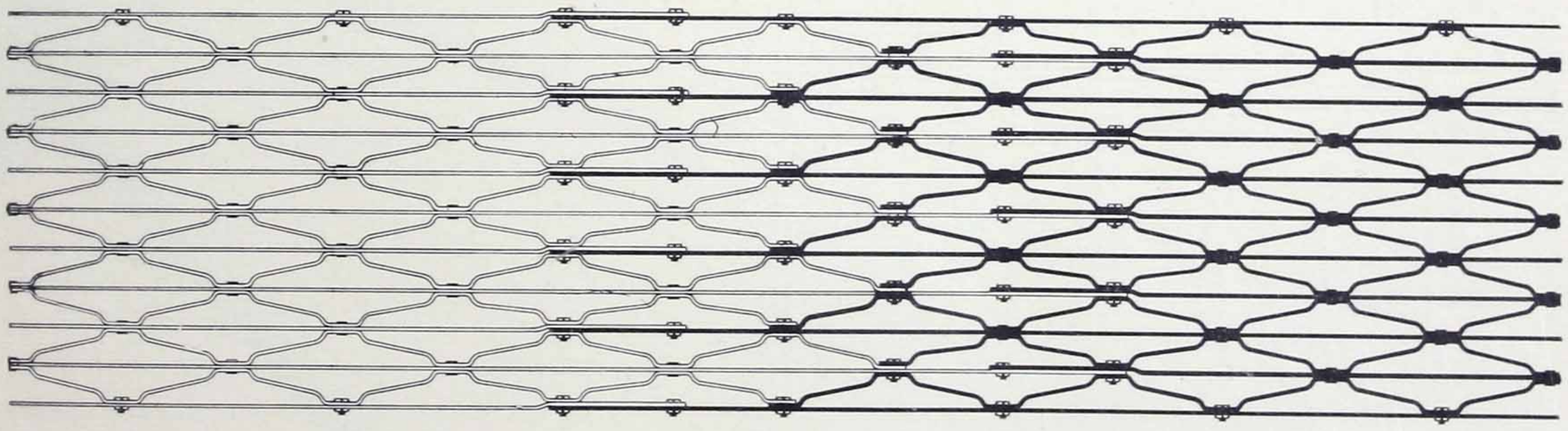
Floor "Life" is Enormously Increased

The limit of the "life" of an **"Irving"** Armored Floor, insofar as the durability of the materials themselves is concerned, has not yet been revealed by experience. Samples have been taken from concrete floors and runways armored with **"Subway"** Flooring panels, after having been subject to traffic and unprotected out-door exposure for 10 and 12 years. The concrete, as was to be expected, is sound. The wearing away of the steel bars on the exposed edges is scarcely measurable. More surprising still, the steel is still securely bonded to the concrete on the faces of the bars, which show only a slight discoloration and ***no corrosion.*** In an **"Irving"** Armored Floor, the steel and the concrete are mutually protective—the steel protects the concrete from grinding, crushing and breaking—the concrete protects the steel from corrosion. There seems every reason to believe that a century of service is a conservative estimate of the life of an **"Irving"** Armored Floor.



TRADE MARK

Plate F—Irving "Streamline" Joint before assembling.



TRADE MARK

Plate G—Irving "Streamline" Joint after assembling.

NINE AD

of "IRVING" Cont

The economical advant
Armored Floor for industri

1 **Up-Keep** There is no up-keep cost on an **"Irving"** Armored Floor where the armoring is laid and anchored in accordance with the simple instructions. No surface cracks develop, to be chipped wider by traffic. No broken spots appear, to be magnified by service to a wide, deep break necessitating an unsightly patch. The "dusting" evil so common with unarmored concrete floors is to all intents eliminated.

2 **Comfort and Safety** These are today recognized in the industrial world as important in their effect upon the efficiency of plant personnel. In an **"Irving"** Armored Floor, that desirable non-slipping quality is retained with a surface that is smooth and even. Protruding bars, or uplifted plate and panel edges, are not present as a constant hazard. Depressed broken spots are not there, to cause discomfort and possibly collect liquids. Machine workers have a secure footing, even where oil must be reckoned with. Men handling wheeled loads have a safe foothold and work with less effort.

3 **Flexibility** This term is used with discretion in this connection, as defining less a quality of the floor itself than a quality which an **"Irving"** Armored Floor gives to a plant. The first thought is to armor a floor only along aisles of traffic, before doorways, or at points of excessive service—and this is good engineering. But rearrangement of plant and equipment is by no means rare; and if the limited application of armor just referred to be followed, rearrangements may leave large unprotected floor areas exposed to traffic wear. ***The broad view of floor engineering provides for all future changes and developments by armoring the entire floor of the plant. This is floor insurance 100% effective.***

4 **Maximum Protection per Unit Weight** In **"Irving"** Armoring, the use of the alternate straight and "reticuline" bars and the distinctive shape given the bend of the "reticuline" bar, combine to form a type of mesh in which a given weight of metal will give more complete protection to the concrete than where any other type of grating is used for armoring. In the **"Irving"** mesh there is a more complete bridging of the gap between bars—i. e., less possibility of a wheel touching the concrete or other floor material.

Adapta-bility While re
has gone
"Irving"
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"plastic" floorings—mastic by
positions of various kinds. W
the topping material is simply
on the armoring, and tamped or

While a sturdy sub-floor is
necessary. In some cases, a sub-
been spread over an old, worn
topping applied. This method
forced concrete slab with armor
larities in the wood floor beneath

VANTAGES

ous Floor Armoring

which recommend an **"Irving"**
poses, may be summarized:

9

d reference has been made, in what
e, to concrete floors, ***the fact is that***
nuous Armoring is equally valuable
ith any of what may be called the
ous names, asphaltic products, com-
ne armoring in place on the sub-floor,
d or spread (hot or cold, as required)
d into the mesh.
s to be preferred, it is by no means
of two or three inches of concrete has
floor—the armoring placed—and the
s, in a sense, a self-supporting rein-
face—entirely independent of irregu-

Efficiency The floor of an industrial plant is a part of the plant transportation system, over which materials and products are moved and handled. Production economy demands that plant traffic move swiftly and easily. An **"Irving"** Armored Floor gives all-directional rail-like smoothness for the movement of traffic—with the least effort, the least time, the least jolting and vibration of the moving loads, and a secure footing for men who handle them.

5

Ease of Installation At first glance, it might appear that the assembling, leveling and anchoring of an **"Irving"** Continuous Armoring structure would be a slow and costly process. As a matter of fact, such is not the case, for by following the simple directions (given later in these pages) the work can be done expeditiously by the class of labor found in any industrial plant. Even if the installation cost of **"Irving"** Armoring were high, it would still be amply justified by the fact that a permanent floor is assured against which subsequent maintenance charges will be practically negligible.

6

Shock Resistance It is not only conceivable, but by no means unusual, that a falling bar or drum or casting—landing upon a single member in a so-called armoring of straight bar or "eggcrate" type—completely loosens or displaces that member; or, falling upon a plate or cast armoring structure, cracks and loosens it. This cannot occur in an **"Irving"** Armored Floor. The falling load may concentrate upon a single member, but the truss construction distributes the shock throughout the members in the surrounding area—without injury to the floor. Should such a thing happen as a rod or bar of steel falling end-on squarely upon the topping in a "mesh" and missing the steel entirely, the most that can occur is a fracture of that small block of topping.

7

Weather-Proof-ness Concrete platforms exposed to weather have been subject to severe injury as the result of water collecting in cracks, freezing, and fracturing the structure. Even in a floor armored (?) with plate or panel units, cracks are found to develop at the joints between units. With **"Irving"** Continuous Armoring there is no opportunity for surface cracks to develop and extend downward. The continuous steel surface reinforcement prevents this.

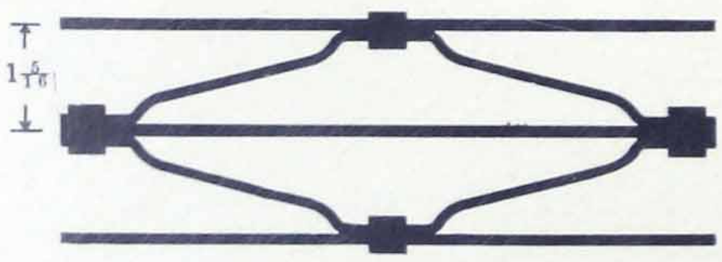
8

Sizes and Types of "IRVING" ARMORING for Various Classes of Service

TRAFFIC duty on floors varies over a wide range—from that of light loads handled on rubber-tired wheels or casters, to that of very heavy loads rolling on metal-tired wheels of small diameter. Obviously no general formula can be given to determine the type of mesh, size of mesh and the depth and thickness of bars required to armor a surface properly. Too many factors are involved—each installation is to some extent an engineering problem in itself.

Generally speaking, smaller truck wheels will call for **"Irving"** Armoring of smaller mesh than where large wheels are used. Rubber-tired wheels permit a larger mesh to be used, than steel-tired wheels. Lighter loads need only lighter bars—heavy loads and "shock" service need heavier, thicker and deeper bars.

TYPE "M"

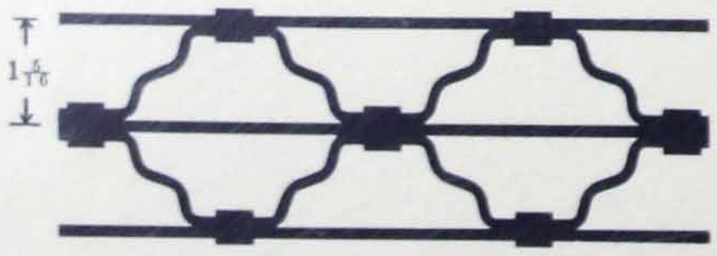


7-inch Rivet Centers

Type "M" Irving Armoring

Within average limits, the following may be taken as a general guide:—for light trucking, "M" mesh with 1"x3/16" straight bars; for moderate or normal trucking, "M" mesh with 1" or 1¼"x3/16" straight bars; for heavy trucking, "M" mesh with 3/16"x1¼" to 2¼" straight bars, or "O" mesh with same bar sizes.

TYPE "O"



3½-inch Rivet Centers

Type "O" Irving Armoring

There is a type and size of **"Irving"** Armoring for every requirement. We have designed and installed armoring for loads as high as 10,000 lbs. per wheel, on a wheel 20" in diameter with 4" face.

DIMENSIONS OF STANDARD ARMORING

Symbol	Depth	Dimension of Bars
2SA	1 "	Straight Bars 1 "x3/16" Reticuline Bars ¾"x⅛"
3S	1¼"	Straight Bars 1¼"x3/16" Reticuline Bars 1 "x⅛"
4SA	1½"	Straight Bars 1½"x⅛" Reticuline Bars 1 "x⅛"
4S	1½"	Straight Bars 1½"x3/16" Reticuline Bars 1 "x⅛"
5S	1¾"	Straight Bars 1¾"x3/16" Reticuline Bars 1 "x⅛"
6S	2 "	Straight Bars 2 "x3/16" Reticuline Bars 1 "x⅛"
7S	2¼"	Straight Bars 2¼"x3/16" Reticuline Bars 1 "x⅛"

Our Engineering Department Will Work Out Your Problems.

Our Engineering Department will study your armoring problem and make recommendations based upon 16 years of flooring experience. But to do this to best advantage we should be fully informed on the following:

(a) Maximum load per wheel?
(b) Wheel base and gauge?
(c) Wheel diameter and face?
(d) Steel or rubber tired?
(e) Power tractors used?
(f) General data, particularly as to extreme conditions to be met?

Instructions for Installing "IRVING" Continuous Floor Armoring

Method of Shipment

Assembly-Marked Units.

"Irving" Continuous Armoring comes in sections of various standard dimensions, but usually about 2 feet wide by 8 feet long. Each section is stamped with an Assembly Mark on the outside face of the outside bar at one end. This stamping (See Fig. 1.) is done with a die indenting the steel bar of the panel so that these marks are permanent and cannot be rubbed off like paint or torn off like tags.

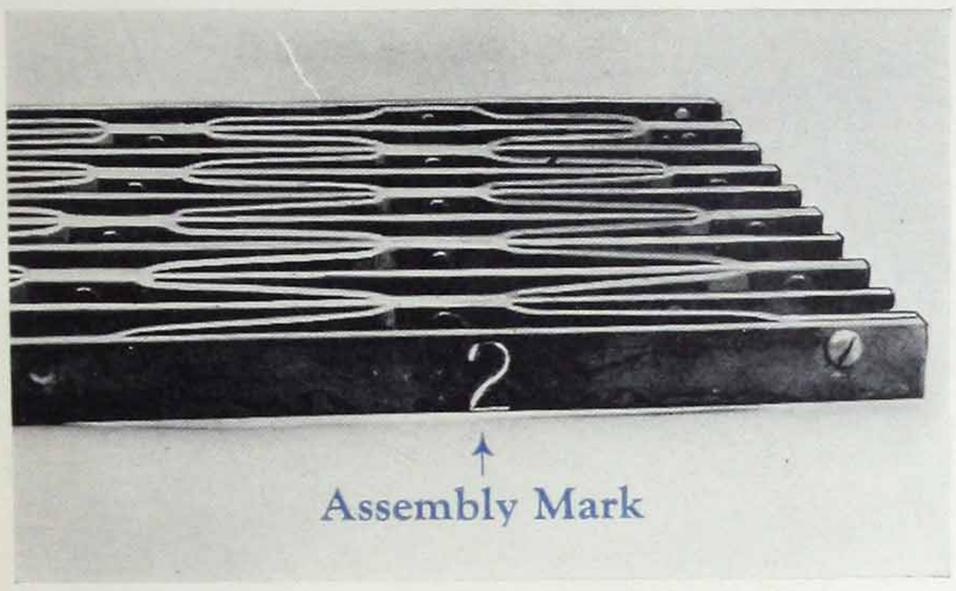


Fig. 1

Loose Bars Bolted for Shipment.

On certain sections one outside bar is not riveted on but is bolted to the section for shipment, so that the sections may be bolted together on the sides, making the armoring continuous laterally as well as longitudinally. These bolted bars are marked with the same Assembly Mark as the section to which they are bolted, for identification in case for any reason they should become separated from the section before installation.

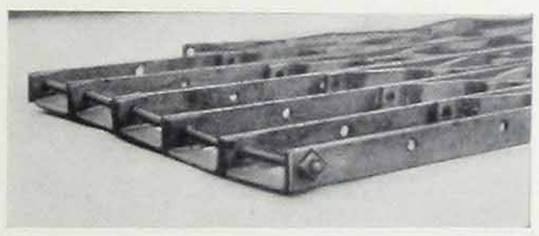


Fig. 2

Ends Protected for Shipping.

For shipping purposes it often becomes necessary to cleat the ends, or band, or bolt together with clips, separators, etc., to protect the free end bars from becoming bent (Fig. 2). All such material should be removed from the sections before installing.

Unloading and Classification.

When **"Irving" Continuous Armoring** is unloaded, or at any rate, before starting to assemble it, all sections bearing the same Assembly Mark should be piled together; i. e., all No. 1 in one pile, all No. 2 in another, etc.

We Furnish All Bolts and Tools.

Each shipment is accompanied by the necessary bolts and one or more sets of Assembly Tools as described below. When shipment arrives these should be carefully taken care of under cover to prevent loss and rust.

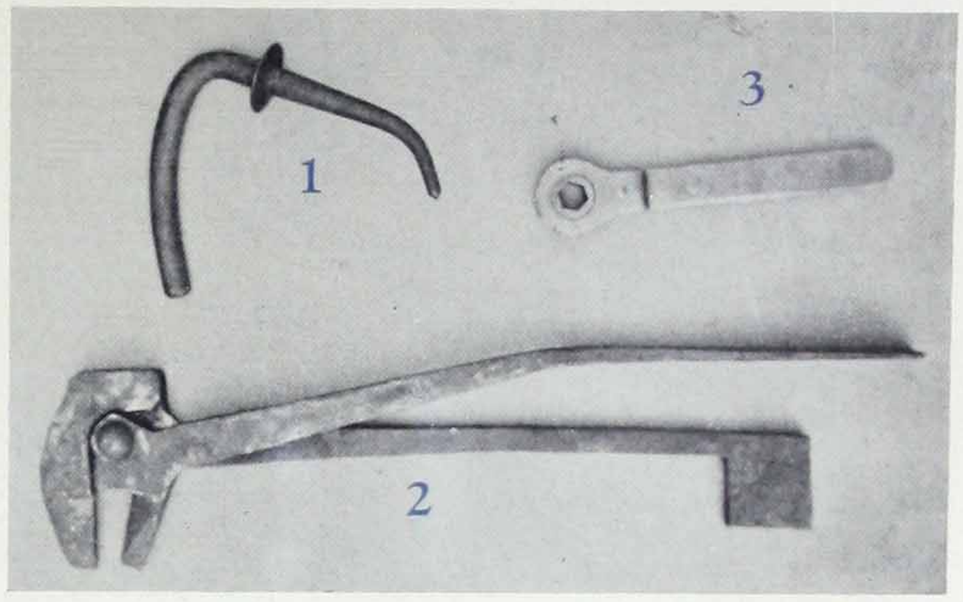


Fig. 3

The Assembly Tools (Fig. 3) are as follows:

Drift Pin.

(1) Drift Pin for centering the holes in the several bars at the joints in the splice.

Special Pliers.

(2) Pliers for gripping the bars together while inserting bolts. This is necessary only at the points where four thicknesses of bars are on one bolt—and not always then. These pliers may also be used as a hammer and the wedge-shaped end of one handle is good to use in easing the bars together in the splice should they be bent out of line a little in shipment or handling.

Ratchet Wrench.

(3) Ratchet Wrench for setting up the bolts. This wrench should be used on the head of the bolt after the nut, which is a lock-nut, is set up by hand.

Usual Methods of Construction

"Irving" Continuous Armoring is adaptable to many uses and may be installed in many ways. The following outline indicates the usual methods.

- (1) Basement Floors (Floors having solid fill beneath.)
  - (1A) New Construction
    1. Concrete
    2. Wood
  - (1B) Topping on Old Floors.
    1. Concrete
    2. Wood
- (2) Upper Floors (Floors having a clearstory underneath.)
  - (2A) New Construction
    1. Steel Beams
    2. Concrete
    3. Wood
  - (2B) Topping on Old Floors.
    1. Steel Beams
    2. Concrete
    3. Wood

(1A) Basement Floors, New Construction.

The sub-base should be prepared and leveled to grade at the pre-determined distance below the finish floor.

This distance is governed by the depth of Armoring which has been decided upon. We recommend at least ¾" more than the depth of the Armoring. Thus if 1" Armoring is specified, the top of sub-base should be 1¾" below the finished floor grade.

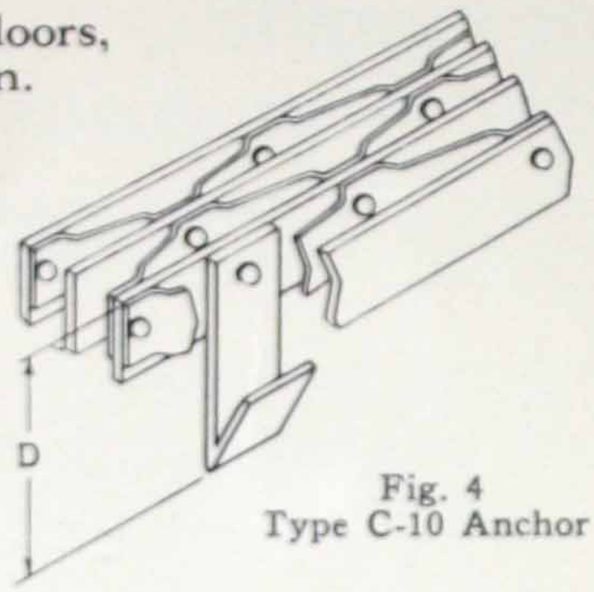


Fig. 4
Type C-10 Anchor

We recommend our standard anchor C-10 as per Fig. 4, and when it is used the sub-base must be carried to grade at a distance "D" below the finished floor. Care in bringing the sub-base to a true grade all over will insure a good job and facilitate the installation of the Armoring and the floor topping.

Before pouring the finished floor, sweep and wash the top of the sub-floor thoroughly.

If several weeks intervene between pouring of sub-floor and finish floor, follow the method described below for 1B.

(1B) Basement Floor, Topping on Old Floor.

Whether the old floor has been chipped out to a proper depth, cast iron plates removed or the topping is to go directly on an old concrete floor, it is essential that the surface be thoroughly cleaned with wire brushes, using muriatic acid to remove oil, grease, etc., thoroughly flushing with clear water, and preferably applying a very thin neat cement grout to the entire surface, brushing the same on with wire brushes. Then follow with method described for 1A.

(2A1) Upper Floors New Construction—Steel Beams.

When the floor is designed to use **"Irving" Continuous Armoring**, the most satisfactory method is to set the steel beam top at the same distance below the finished floor grade as the depth of the Armoring, so that the Armoring can be laid on the top of the beams. In this case the sub-floor should be poured to a level about ¾" below the tops of the floor beams.

Steel Beams Below Bottom of Armoring:—Where the steel floor beams must for other reasons be farther below the finished floor line, the same method of procedure should be followed as in "1A" above.

(2A2) Upper Floors New Construction—Concrete.

Use same method as for "1A" above.

(2A1) Topping Upper Floors Old Floor.

Use same method as "1B" at left.

Armoring on Wood Floor.

Cases 1A2, 1B2, 2A3 and 2B3 are all handled practically the same way. The wood floor, new or old, is swept broom clean and **"Irving" Armoring** assembled and laid directly on the wood floor and spiked or lagged to the wood by means of the angle clips riveted to the Armoring sections. In case of an old floor with worn spots, the Armoring should be shimmed up to level grade over these spots.

After Armoring is laid and fastened down complete, the filler may be spread, and tamped or rolled flush with the top surface. Whether this filling be concrete, mastic, asphalt, or what not, it is essential that the surface be finished **flush with the top so that every bar in the Armoring shows on the surface.**

Assembling the Material

An Erection Diagram is made for each installation of **"Irving" Armoring** and prints are furnished to the customer. This diagram shows the complete layout of the Armoring, indicating the panels by their Assembly Marks.

These marks correspond to the marks stamped on the panels, thus clearly showing exactly where to put each panel. Such an Erection Diagram is shown in Fig. 6.

Starting Assembly.

In starting the assembly it is best to first pick out the sections required to make up the first outside row or a portion of the row at least. For example, No. 1, No. 2 and No. 3 (see Fig. 6); after splicing these, take the next row, No. 4, No. 5 and No. 6, and so on.

Placing Sections with Ends in Right Direction.

Always be careful to place the sections so that the Assembly Mark will be on the end toward which the arrow points. These arrows will be noted on the Erection Diagram in connection with each mark.

Fig. 5

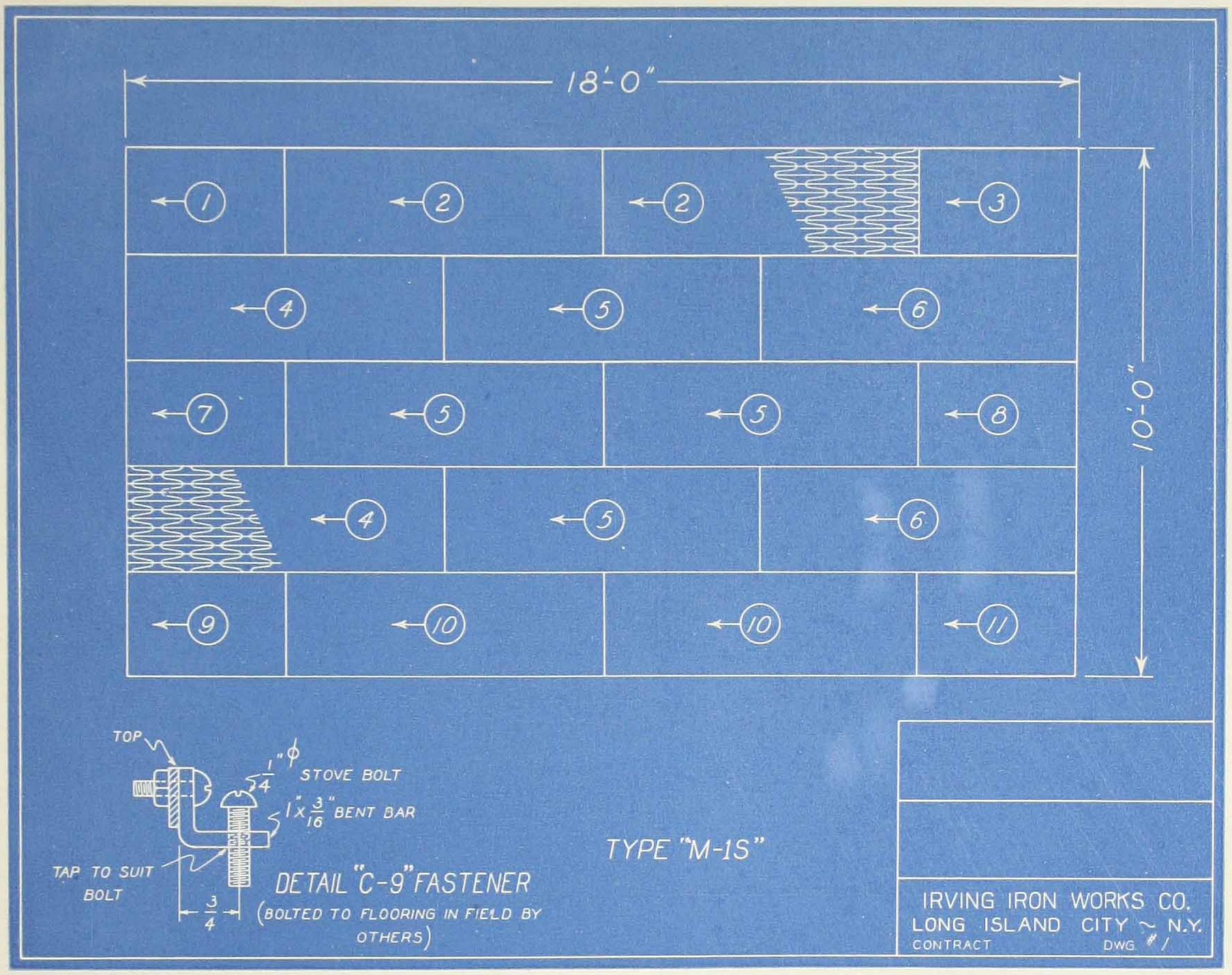


Fig. 6—Specimen Erection Diagram

In making the splice the sections may be left on the floor, raised slightly on skids or blocking, or preferably placed on horses waist high. See Fig. 5.

Have Laps Correct.

Refer to the Splice Diagram, Fig. 7, and as the sections to be spliced are laid together be sure to have all bars lapped on the correct side.

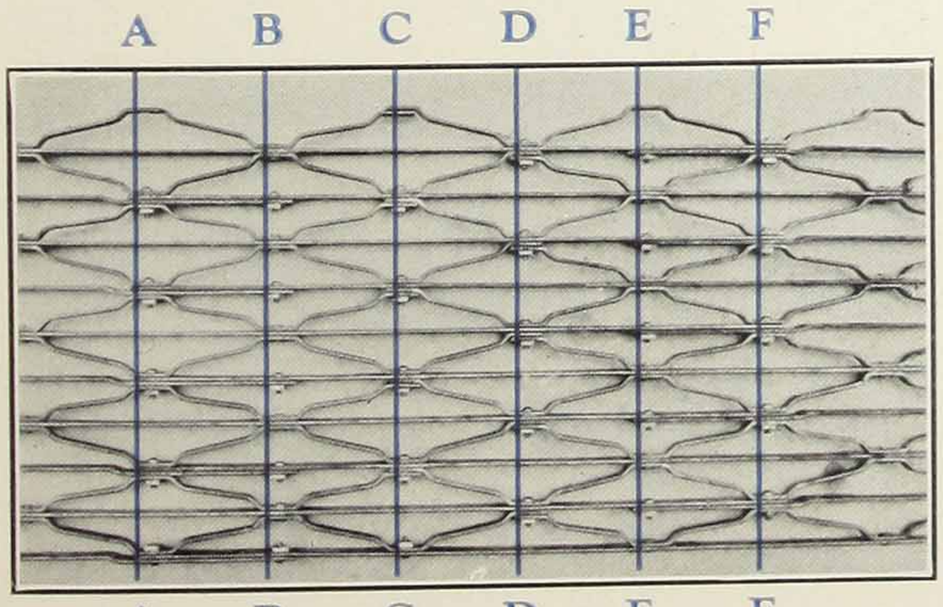


Fig. 7

Drifting and Bolting (Fig. 8).

With the aid of the Drift Pins, if necessary, put bolts in all single lap joints—that is, all bolts on lines E-E and B-B and then turn up nuts thumb tight.

Next put bolts in lines A-A and F-F, and finally in lines C-C and D-D. (All as in splice diagram Fig. 7.)

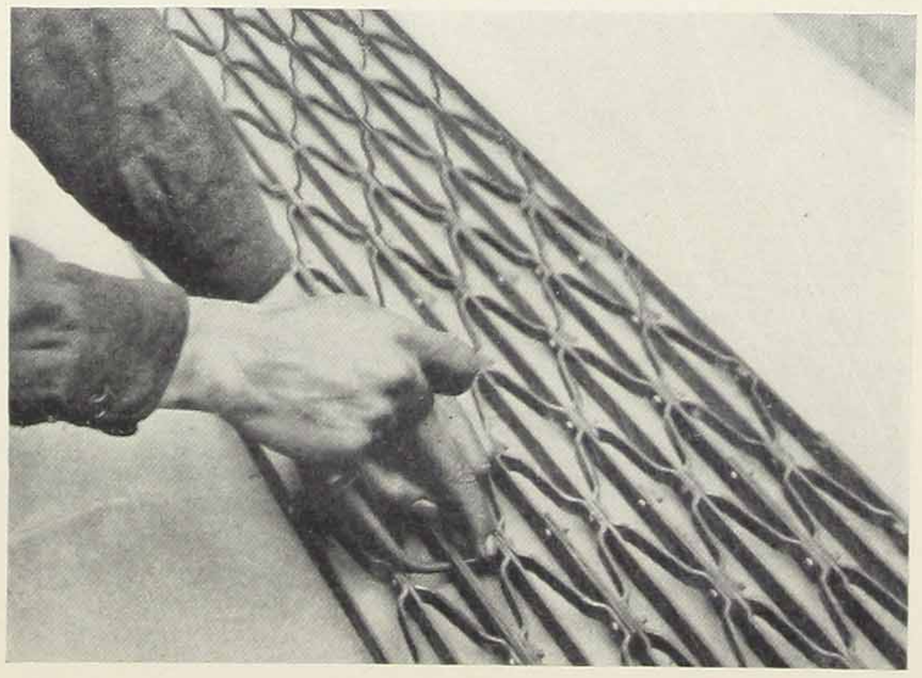


Fig. 8

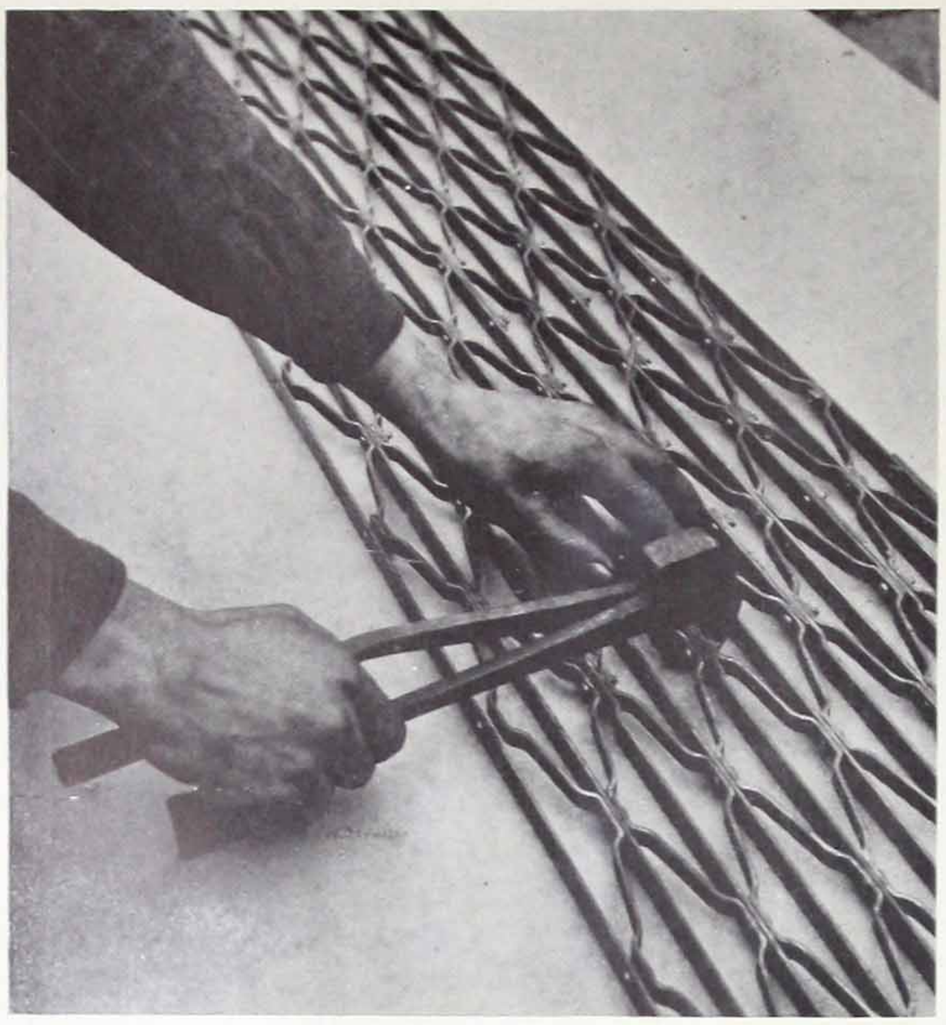


Fig. 9

Use the Pliers.

The Pliers (See Fig. 9) will be found helpful for gripping the bars together at a joint, especially on lines A, C, D and F while removing the Drift Pin and putting in the Bolt.

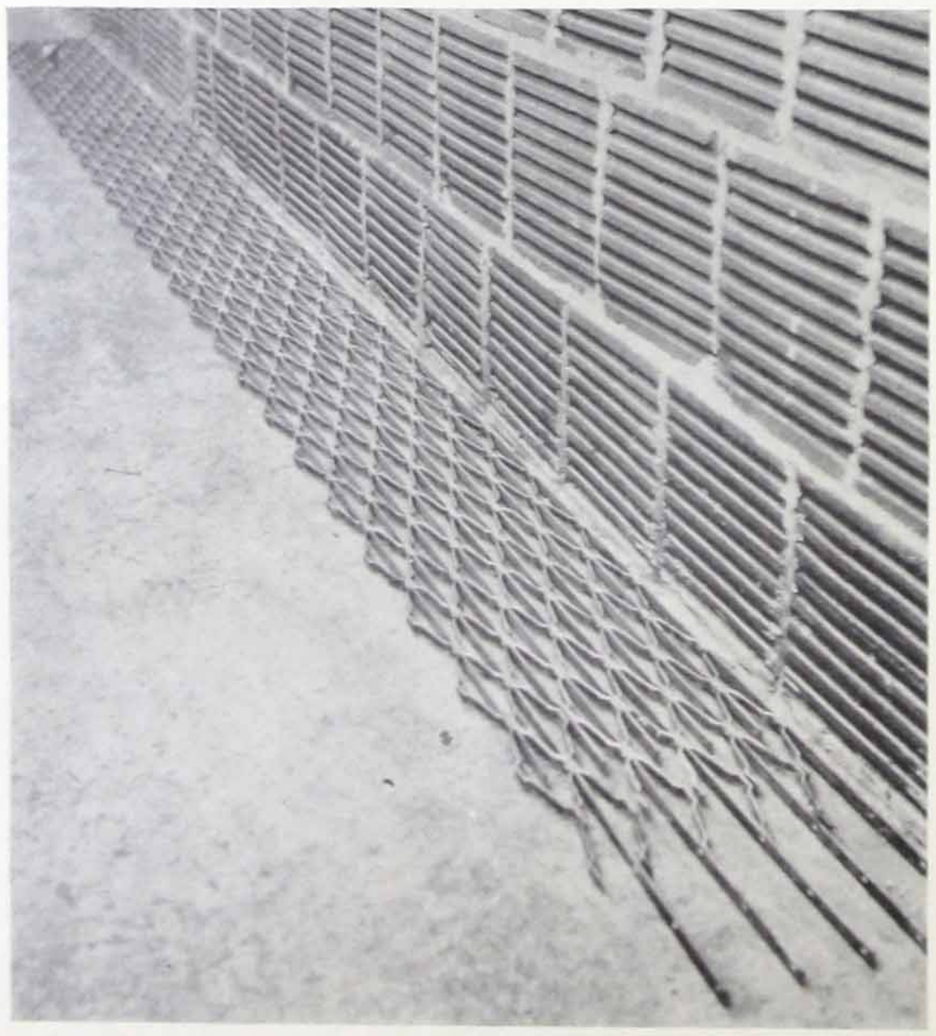


Fig. 10

Handling in Groups.

Several sections such as No. 1, No. 2 and No. 3 (See Fig. 6) with splices bolted together may be handled in one piece and placed in their proper position on the floor. (See Fig. 10.) Next bolt up several sections of the next row such as No. 4, No. 5, No. 6 and No. 7, proceeding with the splicing the same as just described, and then place this strip in position on the floor.

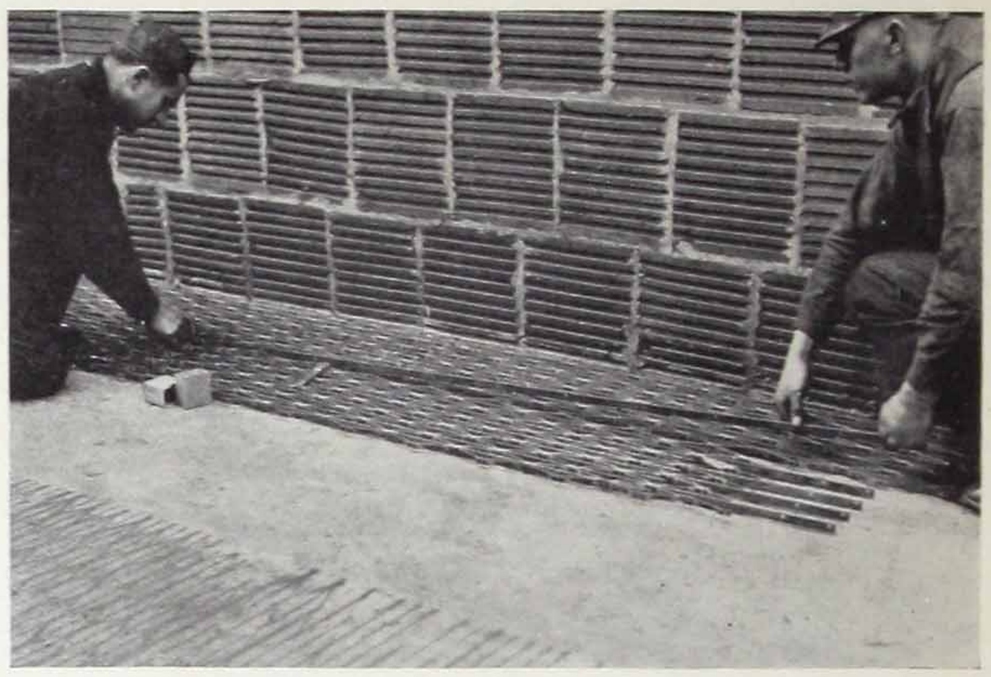


Fig. 11

Making the Side Splices. (Fig. 11)

As noted before, there will be found one outside bar on most of the sections, which bar will not be riveted but bolted on for shipment. **Do not mislay the loose bars on side of sections.**

When the group of sections last spliced are laid alongside of the group previously spliced, the bolts in the loose side bars should be removed and all the holes connecting the adjoining side of the sections are bolted up.

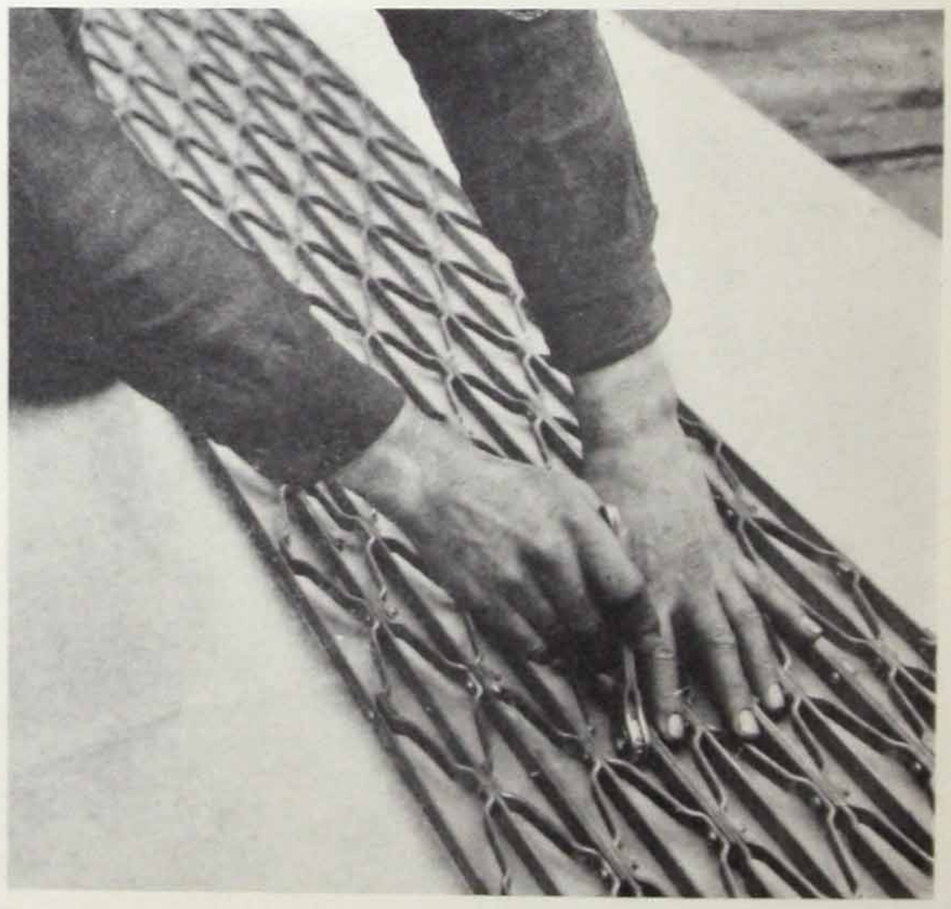


Fig. 12

All Nuts Wrench Tight.

All nuts should finally be turned up tight with the Ratchet Wrench furnished with each shipment.

Leveling

On Steel Beams.

The next step is the levelling of the Armoring.
Where the Armoring rests on steel beams, or the sub-base is accurately levelled, the Armoring will be automatically levelled.

On Irregular Sub-Floor.

Where the sub-base is irregular in surface, Anchor No. C9 should be used. Grade points should be established and a long mason's straight edge, or "striker off," preferably 16 to 18 feet long, should be used.

Use a Straight Edge.

Place the straight edge across the top of the Armoring at right angles to the bars and just to one side of a line of adjustable Anchors No. C9, then with screw driver raise or lower the panels of grating to the lower level by turning the screw in the anchor clip.

Shimming.

Sometimes, with very irregular sub-floors, some points may require a little shimming under the adjusting screw or preferably filling up with cement before setting the Armoring.

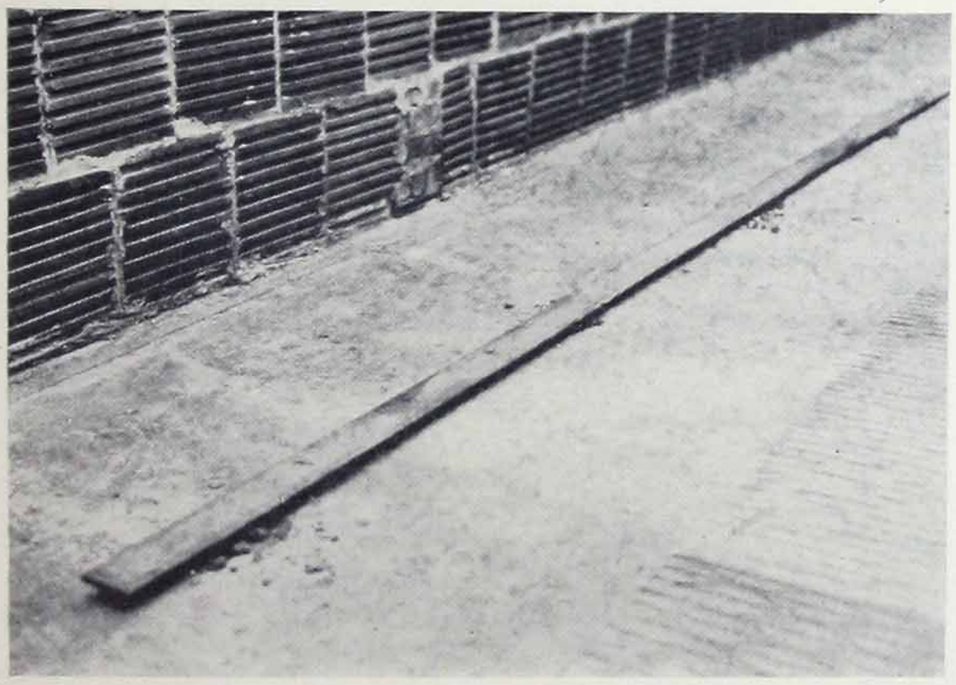


Fig. 13

Another method of levelling is to use iron bars, size about 2" x ¼", laid flatwise and set to grade on plaster or cement spots before placing the Armoring. These should be placed so that they will occur about every four feet apart and be placed at right angles to the bars of the Armoring. (See Fig. 13.)

Levelling with a Coat of Cement.

Where the sub-base is very rough it may be advisable to float a cement mortar coat over the entire floor and screed same to true grade before laying the Armoring.

Pouring Concrete

After the Armoring is entirely laid, spliced and levelled, the concrete or composition fill should be poured. Any specification for the mixture may be used that in the judgment of the customer will produce a good finished floor surface.

Where any stone or gravel aggregate is used, nothing should be used that will not pass a ⅜" ring.

Recommended Mixture.

Where concrete fill is used, the mixture of one part sand, one part cement and one part crushed stone has been found to give good results.

Pouring and Tamping.

Always lay planking down on the armoring for wheeling buggies or barrows in placing the cement fill. In placing a concrete fill, the same should be made fairly wet and thoroughly well tamped, not with hard blows but many lighter ones, making sure that the mixture thoroughly fills the meshes of the Armoring and is fully flush with the top of the bars and then trowelled out to a hard surface as it sets, according to the standard practice of floor finishers.

IMPORTANT! Tops of all Bars Must Show!

Be sure in the final stages to remove all excess cement from the surface, trowelling to a surface **flush with the tops of the bars,** making sure that the entire **top surface** of **each** and **every bar** in the Armoring is **exposed** on the surface, and the cement surface in between is **flush with the tops of the bars.**

IRVING CONTINUOUS FLOOR ARMORING

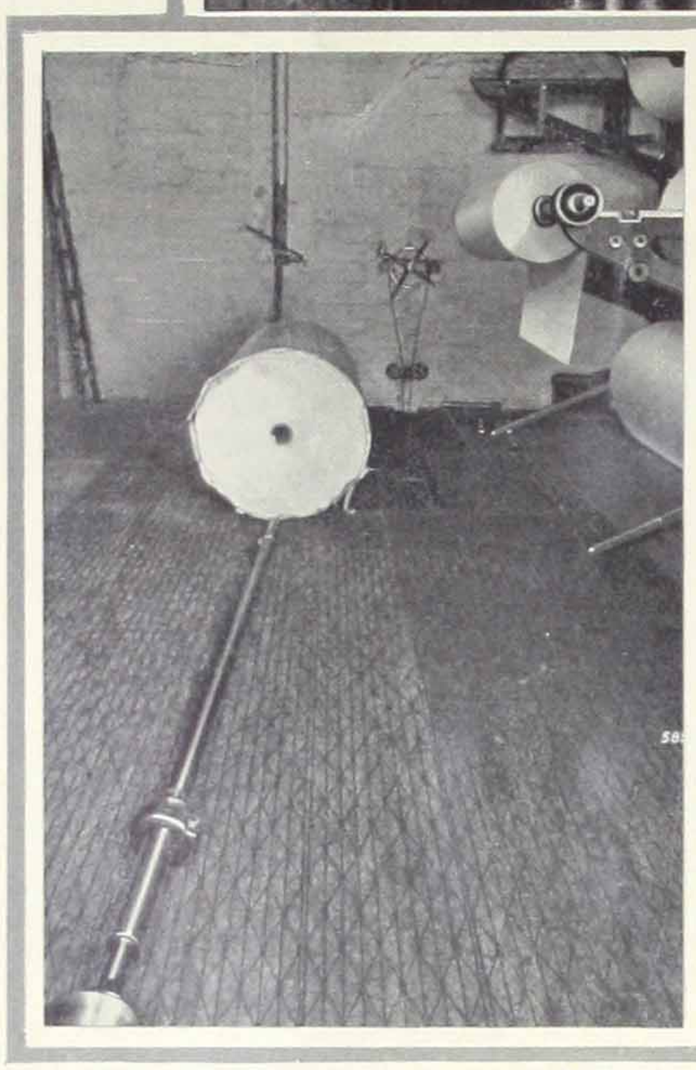


Plate H—"Irving" Armored floor in a newspaper pressroom.

Plate J—A creamery loading platform installed in 1921.

Plate K—The trucking aisleway in the beater room of this paper mill now needs no upkeep or renewal—it has been "Irving" Armored since 1924.

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